* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In the navigation system which displays the directions corresponding to each measurement result of two or more measurement means to measure each condition of two or more measuring objects, and said measurement means, and said measurement result, and notifies the condition of said measuring object The index generation means corresponding to each measurement result of said measurement means, and an environmental recognition means to recognize a transit environment based on each measurement result of said measurement means, The navigation system characterized by having a display means to display the index generated by said index generation means, the recognition result by said environmental recognition means, and the measurement result of said measuring object on one screen.
[Claim 2] In the navigation system which displays the directions corresponding to each measurement result of two or more measurement means to measure each condition of two or more measuring objects, and said measurement means, and said measurement result, and notifies the condition of said measuring object The index generation means corresponding to each measurement result of said measurement means, and an environmental recognition means to recognize a transit environment based on each measurement result of said measurement means, The navigation system characterized by having a notice means of voice to notify with voice the index generated by said index generation means, the recognition result by the environmental recognition means, and the measurement result of said measuring object.
[Claim 3] It is the navigation system which outputs the display screen corresponding to [in claim 1 or claim 2, said index generation means establishes the index storage means memorized beforehand, and / with reference to said index storage means] said reference result in said account index generation means.
[Claim 4] The navigation system which establishes an index calculation means to compute said index, in claim 1 or claim 2 based on said measurement result, and outputs a display screen based on the calculation result of said index calculation means.
[Claim 5] The navigation system which has the function which establishes a directions input means to input directions for an operator to choose the contents of a display in claim 1 or claim 2, and outputs a display screen based on the input result of said directions input means.
[Claim 6] The navigation system which uses a touch panel for a directions input means to input directions for an operator to choose the contents of a display in claim 1 or claim 2.
[Claim 7] The navigation system which has the function which prepares the directions input section which inputs the map information storage section to show the current position and directions of an operator in claim 1 or claim 2, and amends the current position based on the recognition result of said environmental recognition means, or directions of an operator.
[Claim 8] The navigation system which the car rate measured by said measurement means and the car rate used as the index generated by said index generation means are made to adjoin in claim 1 or claim 2, displays, and displays the difference of the car rate and car rate used as an index.
[Claim 9] The navigation system which adjoins and displays the destination ETA at the time of

maintaining the destination ETA and the current vehicle speed at the time of maintaining the full speed generated by said index generation means in claim 1 or claim 2.
[Claim 10] The map information storage section to show the current position in claim 1 or claim 2 is a navigation system which memorizes the configuration and road grade of a road.
[Claim 11] The navigation system which the danger at the time of car transit of the information measured by said measurement means, the index generated by said index generation means is judged in claim 1 or claim 2, and a color is changed according to danger, and is displayed.
[Claim 12] The navigation system by which whenever [car rate, gear location, and throttle valve-opening] is included in the information measured with said measurement means in claim 1 or claim 2 in order that said index generation means may generate an economical transit index.
[Claim 13] The navigation system by which a car rate is contained in the information measured with said measurement means in order to generate an assignment time amount transit index for said index generation means to reach in assignment time amount to the destination in claim 1 or claim 2.
[Claim 14] The navigation system proofread or learned when said measurement result, said recognition result, etc. and the actually produced event have a difference in claim 1 or claim 2.
[Claim 15] The navigation system which can choose automatic and hand control in claim 14 when learning, proofreading and.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the navigation system for mount.
[0002]
[Description of the Prior Art] In order that a driver may drive an automobile safely more conventionally, the number of the instruments (a vehicle speed meter, remaining fuel meter, etc.) with which an automobile is equipped has increased. However, just it is inadequate in order to drive an automobile safely. For example, when it goes to unknown land, a self-vehicle location cannot be known in the conventional instrument. Moreover, in order to know this time amount and the ETA to the destination, it cannot but depend on experience of a driver or a navigator.
[0003] In order to solve such a problem, it is effective to display self-vehicle locations, such as a map of the present position indicator (Japanese-Patent-Application-No. 3-26916 number specification) of a mobile and an automobile. Moreover, it is effective to search and display the minimum distance root from the depature point of a navigation system (Japanese-Patent-Application-No. 2-278116 number specification) which computes and displays a trip and fuel consumption from the vehicle speed and fuel consumption of a run state display (Japanese-Patent-Application-No. 2-264812 number specification) to a target point, the shortest time amount root, etc.
[0004] However, by the above-mentioned approach, since the displays which display a road map, a run state, the shortest root, etc. differ, in order to acquire all information, two or more displays must be seen. Furthermore, an operator's control input must be determined based on two or more information displayed on two or more displays.
[0005]
[Problem(s) to be Solved by the Invention] It was not desirable on insurance to have seen the display installed in the location which an operator or a fellow passenger has to look at all displays, must judge whether the information which which display shows now is needed most with the above-mentioned conventional technique, and is different each time. When displayed on the display with which two information differs in order that an operator may determine control inputs, such as an accelerator, based on a target rate and a car rate when displaying the target rate for economical transit, and an actual car rate furthermore, it is difficult to perform the comparison. When comparing two or more information and determining a control input based on the result, only by displaying, even if information is displayed on two or more displays or is one display, an informational comparison takes time and effort and it is not desirable on insurance.
[0006] An operator recognizes information and directions only by seeing one indicating equipment, and the purpose of this invention is to offer the navigation system which can carry out operation immediately if needed.
[0007]
[Means for Solving the Problem] Two or more measurement means by which this invention measures each condition of two or more measuring objects in order to attain this purpose, In the navigation system which displays the directions corresponding to each measurement result or measurement result of said measurement means, and notifies the condition of said measuring object The index generation means corresponding to each measurement result of said measurement means, and an environmental recognition means to recognize a transit environment based on each measurement result of said measurement means, By having a display means to display the image based on the index generated by said index generation means, the recognition result by the environmental recognition means, and the measurement result of said measuring object on one screen in good order It is made to enable him for an operator to recognize information and directions by seeing one display, and to always carry out operation immediately if needed.
[0008]
[Function] Since two or more information and directions which were detected can be displayed on one

display in good order according to the above-mentioned configuration, an operator recognizes the information and directions which were displayed by seeing one display, and it becomes possible to carry out operation immediately if needed.

[0009]

[Example] Hereafter, the example of this invention is explained based on a drawing.

[0010] Drawing 1 is the block diagram of the 1st example of the navigation system concerning this invention.

[0011] In drawing 1 , 1 is measurement sensor groups, such as wheel speed, battery voltage, and a fuel gage. 2 is environmental-information sensor groups, such as a CCD camera, an infrared sensor, and an ultrasonic sensor. 3 is a display control which determines the contents which start this invention, take in the information on the measurement sensor group 1 and the environmental-information sensor group 2, and are displayed on a display 4. The economical transit index generation section 5 in which the display control 3 which performs actuation concerning this invention generates an economical transit index when the destination and the ETA are inputted based on the measurement result of the measurement sensor group 1, The environmental recognition section 8 which recognizes an environment based on the measurement result of the environmental-information sensor group 2, It is constituted by the notice section 9 of voice which determines the directions input section 7 which inputs directions of the selection operator of the display screen, the display and control section 6 which determines the contents of a display outputted to a display 4, the loudspeaker 10 which performs the notice with voice based on a recognition result, the contents of a display, etc., and the contents notified from a loudspeaker.

[0012] The output of each sensor of the measurement sensor group 1 has the information on the detected physical quantity. Furthermore, abnormalities or danger understands whether the system of that part is normal by in which range this physical quantity is. Moreover, as for the information on the environmental-information sensor group 2, the location of the white line of a road, various road signs, a front obstruction, etc. shall be contained.

[0013] Although the economical transit index is generated here based on the measurement result of various sensors, not only the measurement result of a sensor but the destination and its ETA may be inputted, and, in addition, an assignment time amount transit index, map information and the positional information by communication link, road delay information, etc. may generate delay evasion transit information further.

[0014] Drawing 2 is the block diagram showing the 2nd example of a configuration of starting the navigation system which gave this invention. A display control 3 memorizes the display screen, a map, etc. beforehand, it connects with the measurement sensor group 1 shown by drawing 1 , respectively, the environmental-information sensor group 2 and the directions input section 7, a display 4, and a loudspeaker 10, and especially the navigation system of the 2nd example is constituted. It has the phonetic memory section 26 which has memorized the voice to which the notice section 9 of voice notifies the display screen storage section 25 the display and control section 6 has remembered the method of presentation to be for the index storage section 23 the economical transit index generation section 5 has remembered the index to be, and the map information storage section 24.

[0015] The index storage section 23 outputs the ETA here, when the destination and the ETA are inputted and a target rate is inputted only into the destination. The map information storage section 24 has memorized the road map, the road grade, etc. The display screen storage section 25 memorizes the display screen which displays the recognition result recognized by the measurement result measured by the measurement sensor group 1, the index generated by the economical transit index generation section 5, and the environmental recognition section 8, and searches and determines the screen which displays with the contents selection signal of a display inputted into the directions input section 7.

[0016] If the sampling signal from a clock 21 is inputted, A/D converter 22 will carry out A/D conversion of the value of the measurement sensor group 1, and will input it into the economical transit index generation section 5. Thus, in the navigation system of the 2nd example, the display screen etc. is memorized beforehand. By this, the display screen can be selected at a high speed. Moreover, the signal from the measurement sensor group 1, the economical transit index generation section 5, and the

environmental recognition section 8 can be outputted at once. Moreover, it is also possible to choose and output the contents of a display if needed.

[0017] Drawing 3 is the explanatory view showing one example of the stored data structure and the contents of the index storage section in drawing 2 . In this example, in order to give explanation easy, the contents to which it refers are made into three kinds, the vehicle speed, throttle opening, and remaining fuel, in the economical transit index generation section of drawing 2 , and the stored data structure of the index storage section of drawing 2 serves as a three dimensional array. And this index storage section has memorized the contents of a transit index for every minimum bit of A/D converter 22 in drawing 2 . Moreover, the full span of the vehicle speed, throttle opening, and remaining fuel is set to V (km/h), T (deg), and L (l), respectively.

[0018] Among drawing, A is in a usual condition, the vehicle speed is V (i) and (km/h), and throttle opening is [T (j), (deg), and remaining fuel] L (k, l). Moreover, for throttle opening, T (j) and remaining fuel is [the vehicle speed of the high-speed condition of L (k) and C] V (i), for throttle opening, T (t) and remaining fuel is [the vehicle speed] V (i), the vehicle speed of B is V (v) and, as for the throttle full open condition of L (k), and D, remaining fuel shows [throttle opening shows T (j) and] the lack-of-gasoline condition of L (k). According to such stored data structure, the economical transit index generation section 5 of drawing 2 is in a condition like A-D, as for it, which information (the vehicle speed, throttle opening, remaining fuel) is important for economical transit, change of the future vehicle speed can carry out and the index for [, such as a way,] running economically can be generated.

[0019] Drawing 4 is the explanatory view showing one example of the screen configuration of the display screen of the display in drawing 2 . This example is constituted by the remaining fuel meter 41, the vehicle speed meter 42, the engine rotation meter 43, the economical transit index display tooth space 44, the video image 45 with a mounted camera, path alley drawing 46, and the pan by the screen selection carbon buttons 47, 48, and 410 and the recognition result display 49 of a video image. Here, the economical transit index display 44 is the example which deduced and displayed the destination ETA from the current vehicle speed etc., when the distance to the destination and the destination is inputted. Moreover, the recognition result display tooth space 49 is the example which displayed the result of having recognized the indicator of a highway.

[0020] In addition, an operator or a navigator can also display only information needed using the screen selection carbon buttons 47 and 48,410. A touch panel or a keyboard performs screen selection. Since an image is made legible about a video image 45, screen selection can be performed by touching one in the left half of a video image of parts. Proofreading / study carbon button 411 outputs various messages to a carbon button tooth space based on car information, an image recognition result, etc. Here, although the current position (Yokohama IC) is outputted as a message, transit environments, such as a situation, and the weather and a road surface situation of a surrounding automobile etc. of distance with the vehicle of self-vehicle information and the front that an excess of a rate and a fuel are insufficient, etc. may be outputted.

[0021] Moreover, in the current position, a calculation result may differ from a recognition result. In this case, during a message output, a location can be proofread by pushing a carbon button. Moreover, study of the formula which computes the current position can also be performed. When not pushing the carbon button which performs proofreading and study when a carbon button is furthermore pushed (manual), selection which performs proofreading and study (automatic) can be made.

[0022] Drawing 5 is the explanatory view showing the example of the screen configuration which chose the screen selection carbon button 47 of the display screen in drawing 4 . The display screen 50 in this example consists of remaining fuel meter 41, vehicle speed meter 42, and engine rotation meter 43. By the ability having been made to free screen selection, the contents of a display which the driver or the navigator sensed were unnecessary to transit can be deleted. Moreover, it can return to the display screen of drawing 4 by choosing the screen selection carbon button 47 again if needed.

[0023] Drawing 6 is the explanatory view showing the example of the screen configuration which chose the screen selection carbon button 48 of the display screen in drawing 4 . It is constituted from the display screen 60 in this example by the transit index display tooth space 44, the carbon button 62 for

current position amendment in interchange, the carbon button 63 for current position amendment in a crossing, the carbon button 64 for current position amendment in other points, and the confirmation button 61 for current position amendment. Here, a transit index display tooth space displays the target vehicle speed when the destination and the ETA are inputted. The carbon button for current position amendment in interchange, the carbon button for current position amendment in a crossing, and the carbon button for current position amendment in other points amend the current position by choosing, when putting in interchange, crossings, etc., such as a highway, respectively. Furthermore, amendment is checked with the confirmation button for current position amendment. It can return to the display screen of drawing 4 by choosing the screen selection carbon button 48 again if needed.

[0024] Thus, the economical transit index generation section 5 has memorized all the display screens corresponding to the combination of each value of the measurement sensor group 1, it searches an economical transit index, without being late for the input of each value of the measurement sensor group 1 for every time amount unit of a clock 21, and can output it to a display. In addition, although it assumed in the example that the contents displayed since it is easy were three kinds, the vehicle speed, an engine speed, and remaining fuel, when the number of the measurement items of the measurement sensor group 1 is M, the stored data structure of the economical transit index generation section 5 serves as a M-dimensional array.

[0025] Drawing 7 is the explanatory view showing the example of the screen configuration which displayed the transit index generated by the information and the economical transit index generation section 5 which were measured by the measurement sensor group 1. Display screens 70 in this example are consisted of by the display screen modification carbon button 47, the rate display tooth space 71 and the ETA display tooth space 72 classified by output, and the power status-display tooth space 73.

[0026] the rate display tooth space 71 -- the target car rate display tooth space 74 -- a target car rate and the car rate display tooth space 75 -- the difference of a car rate, a target car rate, and a car rate -- the difference of a target car rate and a car rate is displayed on the display tooth space 76.

[0027] The ETA display tooth space 72 classified by output displays the residual time to the target time of arrival to the destination on the destination ETA at the time of maintaining a current output to the destination ETA display tooth space 78 at the time of maintaining the destination ETA at the time of maintaining the maximum output to the destination ETA display tooth space 77 at the time of maintaining the maximum output, and a current output, and the elapsed time display tooth space 79 to the elapsed time from departure time, and the residual time display tooth space 710.

[0028] the power status-display tooth space 73 -- motor temperature is displayed [the remaining fuel display tooth space 711] to an electrical potential difference and the inverter temperature display tooth space 714 on inverter temperature and the motor temperature display tooth space 715 to remaining fuel and the current display tooth space 712 at a current and the electrical-potential-difference display tooth space 713. Moreover, when the ETA according to output shifts from the target arrival time sharply, it may change and display not only a numeric value but a color. Also when a power condition runs, trouble is caused or trouble is likely to be caused, not only a digital readout but a color may be changed and displayed. Furthermore, it is not the limitation although the power condition is displayed numerically.

[0029] Drawing 8 is the block diagram showing the 3rd example of the navigation system of this invention. It connects with the measurement sensor group 1 which a display control 3 computes the display screen and an economical transit index, asks especially for the navigation system of this example, and showed it by drawing 1 , respectively, the environmental-information sensor group 2 and the directions input section 7, the display 4, and the loudspeaker 10. The case where it has the phonetic memory section 26 which has memorized the voice to which the notice section 9 of voice notifies the display screen calculation section 82 in which a display and control section 6 computes the method of presentation for the index calculation section 81 in which the economical transit index generation section 5 computes an index, and the map information storage section 24 is shown.

[0030] The index calculation section 81 outputs the ETA here, when the destination and the ETA are inputted and a target rate is inputted only into the destination. The map information storage section 24 has memorized the road map, the road grade, etc. The display screen calculation section 82 computes the

display screen which displays the recognition result recognized by the measurement result measured by the measurement sensor group 1, the index generated by the economical transit index generation section 5, and the environmental recognition section 8, and determines the screen displayed with the contents selection signal of a display inputted into the directions input section 7. If the sampling signal from a clock 21 is inputted, A/D converter 22 will carry out A/D conversion of the value of the measurement sensor group 1, and will input it into the economical transit index generation section 5. Thus, the display screen etc. is computed in the navigation system of the 3rd example. Storage capacity of the display screen can be lessened by this.

[0031] Drawing 8 is the block diagram of this example in the case of having the display screen calculation section 82 as which a display and control section 6 determines the various methods of presentation for the index calculation section 81 as which the economical transit index generation section 5 determines various transit indexes by the operation by the operation. If the sampling signal from a clock 21 is inputted, A/D converter 22 will carry out A/D conversion of the value of the measurement sensor group 1, and will input it into the index calculation section 81. The index calculation section 81 calculates and determines the various information on the index displayed with this value. Moreover, the various information on the screen displayed by the selection information of the display screen inputted into the directions input section 7 by the driver or the navigator is calculated and determined.

[0032] In the above two examples, the difference in the case where the economical transit index generation section 5 and a display and control section 6 are equipped with the index storage section 23 and the display screen storage section 24, respectively, and the case of having the index calculation section 81 and the display screen calculation section 82 is as stating below. That is, since all the display screens are beforehand memorized when the display and control section 6 is equipped with screen **** 24 in a display, while a display and control section 6 does not have the need of calculating nothing, much storage capacity for memorizing the various display screens is needed. On the other hand, when the display and control section 6 is equipped with the display screen calculation section 82, since it is necessary to compute the various display screens using such operation expression while there is little storage capacity since it is only that a display and control section 6 memorizes various operation expression, and ending, the need of performing some count comes out of a display and control section 6. Therefore, it should just determine any shall be used between the approach that the display and control section 6 is equipped with screen **** 24 in a display, and an approach equipped with the display screen calculation section 82 from the arithmetic proficiency of a display and control section 6, and the relation of storage capacity. This is the same also about the economical transit index generation section 5.

[0033]

[Effect of the Invention] Since two or more information and directions which were detected are displayed on one display according to this invention, an operator becomes possible [recognizing the displayed information and directions only by 1 screen **** in an instant].

[Translation done.]

TECHNICAL FIELD

[Industrial Application] This invention relates to the navigation system for mount.

[Translation done.]

PRIOR ART

[Description of the Prior Art] In order that a driver may drive an automobile safely more conventionally, the number of the instruments (a vehicle speed meter, remaining fuel meter, etc.) with which an automobile is equipped has increased. However, just it is inadequate in order to drive an automobile safely. For example, when it goes to unknown land, a self-vehicle location cannot be known in the conventional instrument. Moreover, in order to know this time amount and the ETA to the destination, it cannot but depend on experience of a driver or a navigator.

[0003] In order to solve such a problem, it is effective to display self-vehicle locations, such as a map of the present position indicator (Japanese-Patent-Application-No. 3-26916 number specification) of a mobile and an automobile. Moreover, it is effective to search and display the minimum distance root from the depature point of a navigation system (Japanese-Patent-Application-No. 2-278116 number specification) which computes and displays a trip and fuel consumption from the vehicle speed and fuel consumption of a run state display (Japanese-Patent-Application-No. 2-264812 number specification) to a target point, the shortest time amount root, etc.

[0004] However, by the above-mentioned approach, since the displays which display a road map, a run state, the shortest root, etc. differ, in order to acquire all information, two or more displays must be seen. Furthermore, an operator's control input must be determined based on two or more information displayed on two or more displays.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] Since two or more information and directions which were detected are displayed on one display according to this invention, an operator becomes possible [recognizing the displayed information and directions only by 1 screen **** in an instant].

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] It was not desirable on insurance to have seen the display installed in the location which an operator or a fellow passenger has to look at all displays, must judge whether the information which which display shows now is needed most with the above-mentioned conventional technique, and is different each time. When displayed on the display with which two information differs in order that an operator may determine control inputs, such as an accelerator, based on a target rate and a car rate when displaying the target rate for economical transit, and an actual car rate furthermore, it is difficult to perform the comparison. When comparing two or more information and determining a control input based on the result, only by displaying, even if information is displayed on two or more displays or is one display, an informational comparison takes time and effort and it is not desirable on insurance.

[0006] An operator recognizes information and directions only by seeing one indicating equipment, and the purpose of this invention is to offer the navigation system which can carry out operation immediately if needed.

[Translation done.]

MEANS

[Means for Solving the Problem] Two or more measurement means by which this invention measures each condition of two or more measuring objects in order to attain this purpose, In the navigation system which displays the directions corresponding to each measurement result or measurement result of said measurement means, and notifies the condition of said measuring object The index generation means corresponding to each measurement result of said measurement means, and an environmental recognition means to recognize a transit environment based on each measurement result of said measurement means, By having a display means to display the image based on the index generated by said index generation means, the recognition result by the environmental recognition means, and the measurement result of said measuring object on one screen in good order It is made to enable him for an operator to recognize information and directions by seeing one display, and to always carry out operation immediately if needed.

[Translation done.]

OPERATION

[Function] Since two or more information and directions which were detected can be displayed on one display in good order according to the above-mentioned configuration, an operator recognizes the information and directions which were displayed by seeing one display, and it becomes possible to carry out operation immediately if needed.

[Translation done.]

EXAMPLE

[Example] Hereafter, the example of this invention is explained based on a drawing.
[0010] Drawing 1 is the block diagram of the 1st example of the navigation system concerning this invention.
[0011] In drawing 1 , 1 is measurement sensor groups, such as wheel speed, battery voltage, and a fuel gage. 2 is environmental-information sensor groups, such as a CCD camera, an infrared sensor, and an ultrasonic sensor. 3 is a display control which determines the contents which start this invention, take in the information on the measurement sensor group 1 and the environmental-information sensor group 2, and are displayed on a display 4. The economical transit index generation section 5 in which the display control 3 which performs actuation concerning this invention generates an economical transit index when the destination and the ETA are inputted based on the measurement result of the measurement sensor group 1, The environmental recognition section 8 which recognizes an environment based on the measurement result of the environmental-information sensor group 2, It is constituted by the notice section 9 of voice which determines the directions input section 7 which inputs directions of the selection operator of the display screen, the display and control section 6 which determines the contents of a display outputted to a display 4, the loudspeaker 10 which performs the notice with voice based on a recognition result, the contents of a display, etc., and the contents notified from a loudspeaker.
[0012] The output of each sensor of the measurement sensor group 1 has the information on the detected physical quantity. Furthermore, abnormalities or danger understands whether the system of that part is normal by in which range this physical quantity is. Moreover, as for the information on the environmental-information sensor group 2, the location of the white line of a road, various road signs, a front obstruction, etc. shall be contained.
[0013] Although the economical transit index is generated here based on the measurement result of various sensors, not only the measurement result of a sensor but the destination and its ETA may be inputted, and, in addition, an assignment time amount transit index, map information and the positional information by communication link, road delay information, etc. may generate delay evasion transit information further.
[0014] Drawing 2 is the block diagram showing the 2nd example of a configuration of starting the navigation system which gave this invention. A display control 3 memorizes the display screen, a map, etc. beforehand, it connects with the measurement sensor group 1 shown by drawing 1 , respectively, the environmental-information sensor group 2 and the directions input section 7, a display 4, and a loudspeaker 10, and especially the navigation system of the 2nd example is constituted. It has the phonetic memory section 26 which has memorized the voice to which the notice section 9 of voice notifies the display screen storage section 25 the display and control section 6 has remembered the method of presentation to be for the index storage section 23 the economical transit index generation section 5 has remembered the index to be, and the map information storage section 24.
[0015] The index storage section 23 outputs the ETA here, when the destination and the ETA are inputted and a target rate is inputted only into the destination. The map information storage section 24 has memorized the road map, the road grade, etc. The display screen storage section 25 memorizes the display screen which displays the recognition result recognized by the measurement result measured by the measurement sensor group 1, the index generated by the economical transit index generation section 5, and the environmental recognition section 8, and searches and determines the screen which displays with the contents selection signal of a display inputted into the directions input section 7.
[0016] If the sampling signal from a clock 21 is inputted, A/D converter 22 will carry out A/D conversion of the value of the measurement sensor group 1, and will input it into the economical transit index generation section 5. Thus, in the navigation system of the 2nd example, the display screen etc. is memorized beforehand. By this, the display screen can be selected at a high speed. Moreover, the signal from the measurement sensor group 1, the economical transit index generation section 5, and the environmental recognition section 8 can be outputted at once. Moreover, it is also possible to choose and output the contents of a display if needed.

[0017] Drawing 3 is the explanatory view showing one example of the stored data structure and the contents of the index storage section in drawing 2 . In this example, in order to give explanation easy, the contents to which it refers are made into three kinds, the vehicle speed, throttle opening, and remaining fuel, in the economical transit index generation section of drawing 2 , and the stored data structure of the index storage section of drawing 2 serves as a three dimensional array. And this index storage section has memorized the contents of a transit index for every minimum bit of A/D converter 22 in drawing 2 . Moreover, the full span of the vehicle speed, throttle opening, and remaining fuel is set to V (km/h), T (deg), and L (l), respectively.

[0018] Among drawing, A is in a usual condition, the vehicle speed is V (i) and (km/h), and throttle opening is [T (j), (deg), and remaining fuel] L (k, l). Moreover, for throttle opening, T (j) and remaining fuel is [the vehicle speed of the high-speed condition of L (k) and C] V (i), for throttle opening, T (t) and remaining fuel is [the vehicle speed] V (i), the vehicle speed of B is V (v) and, as for the throttle full open condition of L (k), and D, remaining fuel shows [throttle opening shows T (j) and] the lack-of-gasoline condition of L (k). According to such stored data structure, the economical transit index generation section 5 of drawing 2 is in a condition like A-D, as for it, which information (the vehicle speed, throttle opening, remaining fuel) is important for economical transit, change of the future vehicle speed can carry out and the index for [, such as a way,] running economically can be generated.

[0019] Drawing 4 is the explanatory view showing one example of the screen configuration of the display screen of the display in drawing 2 . This example is constituted by the remaining fuel meter 41, the vehicle speed meter 42, the engine rotation meter 43, the economical transit index display tooth space 44, the video image 45 with a mounted camera, path alley drawing 46, and the pan by the screen selection carbon buttons 47, 48, and 410 and the recognition result display 49 of a video image. Here, the economical transit index display 44 is the example which deduced and displayed the destination ETA from the current vehicle speed etc., when the distance to the destination and the destination is inputted. Moreover, the recognition result display tooth space 49 is the example which displayed the result of having recognized the indicator of a highway.

[0020] In addition, an operator or a navigator can also display only information needed using the screen selection carbon buttons 47 and 48,410. A touch panel or a keyboard performs screen selection. Since an image is made legible about a video image 45, screen selection can be performed by touching one in the left half of a video image of parts. Proofreading / study carbon button 411 outputs various messages to a carbon button tooth space based on car information, an image recognition result, etc. Here, although the current position (Yokohama IC) is outputted as a message, transit environments, such as a situation, and the weather and a road surface situation of a surrounding automobile etc. of distance with the vehicle of self-vehicle information and the front that an excess of a rate and a fuel are insufficient, etc. may be outputted.

[0021] Moreover, in the current position, a calculation result may differ from a recognition result. In this case, during a message output, a location can be proofread by pushing a carbon button. Moreover, study of the formula which computes the current position can also be performed. When not pushing the carbon button which performs proofreading and study when a carbon button is furthermore pushed (manual), selection which performs proofreading and study (automatic) can be made.

[0022] Drawing 5 is the explanatory view showing the example of the screen configuration which chose the screen selection carbon button 47 of the display screen in drawing 4 . The display screen 50 in this example consists of remaining fuel meter 41, vehicle speed meter 42, and engine rotation meter 43. By the ability having been made to free screen selection, the contents of a display which the driver or the navigator sensed were unnecessary to transit can be deleted. Moreover, it can return to the display screen of drawing 4 by choosing the screen selection carbon button 47 again if needed.

[0023] Drawing 6 is the explanatory view showing the example of the screen configuration which chose the screen selection carbon button 48 of the display screen in drawing 4 . It is constituted from the display screen 60 in this example by the transit index display tooth space 44, the carbon button 62 for current position amendment in interchange, the carbon button 63 for current position amendment in a crossing, the carbon button 64 for current position amendment in other points, and the confirmation

button 61 for current position amendment. Here, a transit index display tooth space displays the target vehicle speed when the destination and the ETA are inputted. The carbon button for current position amendment in interchange, the carbon button for current position amendment in a crossing, and the carbon button for current position amendment in other points amend the current position by choosing, when putting in interchange, crossings, etc., such as a highway, respectively. Furthermore, amendment is checked with the confirmation button for current position amendment. It can return to the display screen of drawing 4 by choosing the screen selection carbon button 48 again if needed.

[0024] Thus, the economical transit index generation section 5 has memorized all the display screens corresponding to the combination of each value of the measurement sensor group 1, it searches an economical transit index, without being late for the input of each value of the measurement sensor group 1 for every time amount unit of a clock 21, and can output it to a display. In addition, although it assumed in the example that the contents displayed since it is easy were three kinds, the vehicle speed, an engine speed, and remaining fuel, when the number of the measurement items of the measurement sensor group 1 is M, the stored data structure of the economical transit index generation section 5 serves as a M-dimensional array.

[0025] Drawing 7 is the explanatory view showing the example of the screen configuration which displayed the transit index generated by the information and the economical transit index generation section 5 which were measured by the measurement sensor group 1. Display screens 70 in this example are consisted of by the display screen modification carbon button 47, the rate display tooth space 71 and the ETA display tooth space 72 classified by output, and the power status-display tooth space 73.

[0026] the rate display tooth space 71 -- the target car rate display tooth space 74 -- a target car rate and the car rate display tooth space 75 -- the difference of a car rate, a target car rate, and a car rate -- the difference of a target car rate and a car rate is displayed on the display tooth space 76.

[0027] The ETA display tooth space 72 classified by output displays the residual time to the target time of arrival to the destination on the destination ETA at the time of maintaining a current output to the destination ETA display tooth space 78 at the time of maintaining the destination ETA at the time of maintaining the maximum output to the destination ETA display tooth space 77 at the time of maintaining the maximum output, and a current output, and the elapsed time display tooth space 79 to the elapsed time from departure time, and the residual time display tooth space 710.

[0028] the power status-display tooth space 73 -- motor temperature is displayed [the remaining fuel display tooth space 711] to an electrical potential difference and the inverter temperature display tooth space 714 on inverter temperature and the motor temperature display tooth space 715 to remaining fuel and the current display tooth space 712 at a current and the electrical-potential-difference display tooth space 713. Moreover, when the ETA according to output shifts from the target arrival time sharply, it may change and display not only a numeric value but a color. Also when a power condition runs, trouble is caused or trouble is likely to be caused, not only a digital readout but a color may be changed and displayed. Furthermore, it is not the limitation although the power condition is displayed numerically.

[0029] Drawing 8 is the block diagram showing the 3rd example of the navigation system of this invention. It connects with the measurement sensor group 1 which a display control 3 computes the display screen and an economical transit index, asks especially for the navigation system of this example, and showed it by drawing 1 , respectively, the environmental-information sensor group 2 and the directions input section 7, the display 4, and the loudspeaker 10. The case where it has the phonetic memory section 26 which has memorized the voice to which the notice section 9 of voice notifies the display screen calculation section 82 in which a display and control section 6 computes the method of presentation for the index calculation section 81 in which the economical transit index generation section 5 computes an index, and the map information storage section 24 is shown.

[0030] The index calculation section 81 outputs the ETA here, when the destination and the ETA are inputted and a target rate is inputted only into the destination. The map information storage section 24 has memorized the road map, the road grade, etc. The display screen calculation section 82 computes the display screen which displays the recognition result recognized by the measurement result measured by the measurement sensor group 1, the index generated by the economical transit index generation section

5, and the environmental recognition section 8, and determines the screen displayed with the contents selection signal of a display inputted into the directions input section 7. If the sampling signal from a clock 21 is inputted, A/D converter 22 will carry out A/D conversion of the value of the measurement sensor group 1, and will input it into the economical transit index generation section 5. Thus, the display screen etc. is computed in the navigation system of the 3rd example. Storage capacity of the display screen can be lessened by this.

[0031] Drawing 8 is the block diagram of this example in the case of having the display screen calculation section 82 as which a display and control section 6 determines the various methods of presentation for the index calculation section 81 as which the economical transit index generation section 5 determines various transit indexes by the operation by the operation. If the sampling signal from a clock 21 is inputted, A/D converter 22 will carry out A/D conversion of the value of the measurement sensor group 1, and will input it into the index calculation section 81. The index calculation section 81 calculates and determines the various information on the index displayed with this value. Moreover, the various information on the screen displayed by the selection information of the display screen inputted into the directions input section 7 by the driver or the navigator is calculated and determined.

[0032] In the above two examples, the difference in the case where the economical transit index generation section 5 and a display and control section 6 are equipped with the index storage section 23 and the display screen storage section 24, respectively, and the case of having the index calculation section 81 and the display screen calculation section 82 is as stating below. That is, since all the display screens are beforehand memorized when the display and control section 6 is equipped with screen **** 24 in a display, while a display and control section 6 does not have the need of calculating nothing, much storage capacity for memorizing the various display screens is needed. On the other hand, when the display and control section 6 is equipped with the display screen calculation section 82, since it is necessary to compute the various display screens using such operation expression while there is little storage capacity since it is only that a display and control section 6 memorizes various operation expression, and ending, the need of performing some count comes out of a display and control section 6. Therefore, it should just determine any shall be used between the approach that the display and control section 6 is equipped with screen **** 24 in a display, and an approach equipped with the display screen calculation section 82 from the arithmetic proficiency of a display and control section 6, and the relation of storage capacity. This is the same also about the economical transit index generation section 5.

[Translation done.]

DESCRIPTION OF DRAWINGS

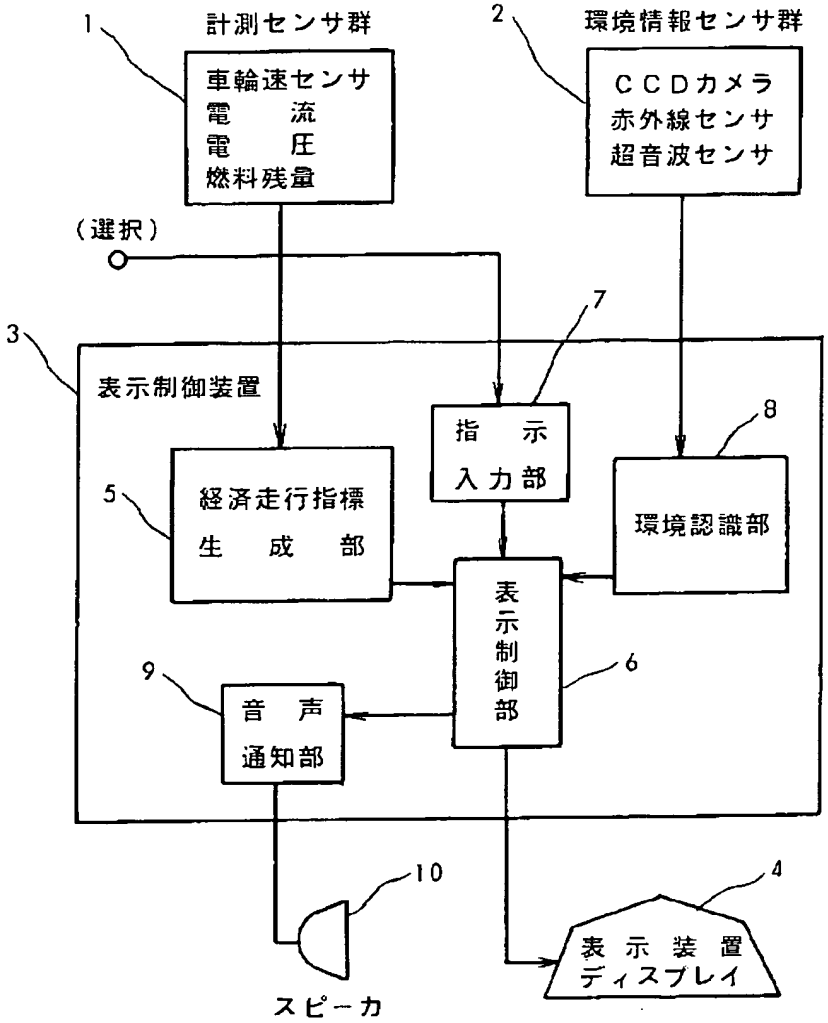
[Brief Description of the Drawings]
[Drawing 1] The block diagram of the 1st example of this invention.
[Drawing 2] A block diagram in case the economical transit index generation section and a display and control section are equipped with the index storage section and the display screen storage section, respectively.
[Drawing 3] The explanatory view of the stored data structure of the index storage section.
[Drawing 4] The screen explanatory view at the time of displaying car information, an economical transit index, a video image, and a road map.
[Drawing 5] The front view at the time of displaying car information.
[Drawing 6] The front view at the time of displaying an economical transit index.
[Drawing 7] The explanatory view of the screen at the time of displaying car information and an economical transit index.
[Drawing 8] A block diagram in case the economical transit index generation section and a display and control section are equipped with the index calculation section and the display screen calculation section, respectively.
[Description of Notations]
1 [-- A display, 5 / -- The economical transit index generation section, 6 / -- A display and control section, 7 / -- The directions input section, 8 / -- The environmental recognition section, 8 / -- The notice section of voice 10 / -- Loudspeaker.] -- A measurement sensor group, 2 -- An environmental-information sensor group, 3 -- A display control, 4

[Translation done.]

DRAWINGS

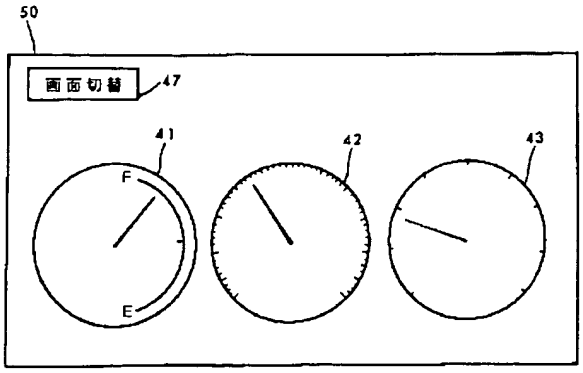
[Drawing 1]

図 1



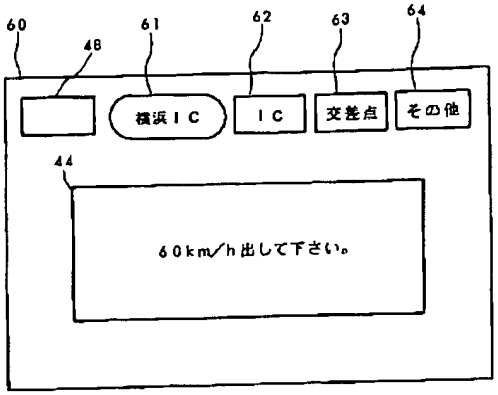
[Drawing 5]

図 5



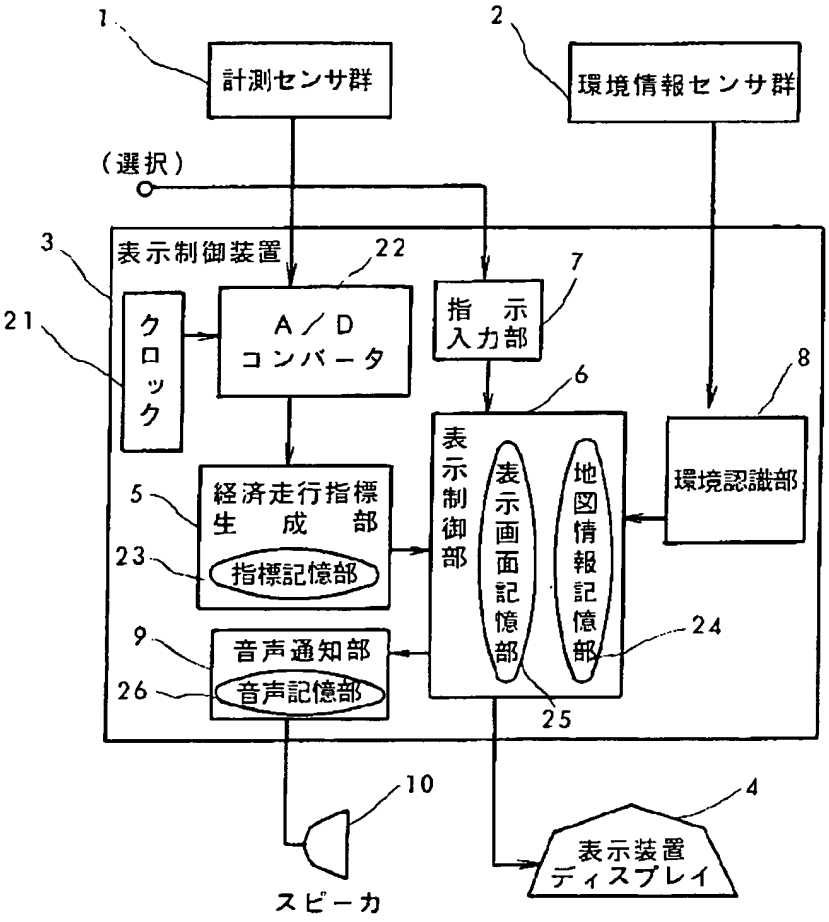
[Drawing 6]

図 6



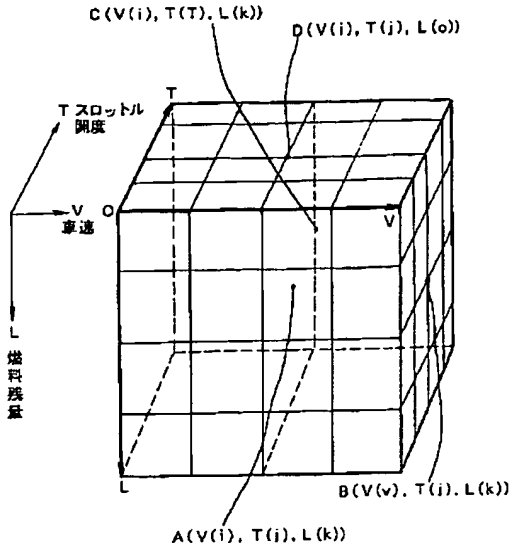
[Drawing 2]

図 2



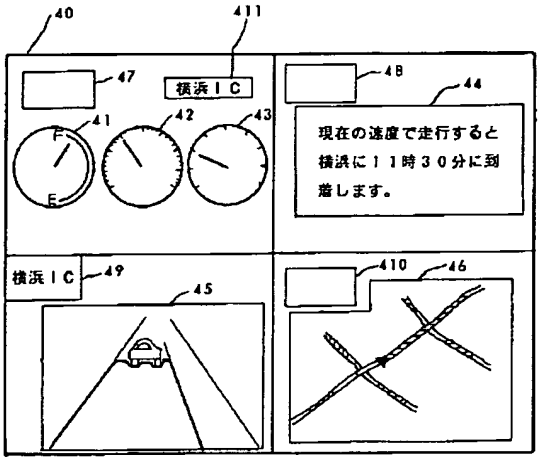
[Drawing 3]

図 3



[Drawing 4]

図 4



[Drawing 7]

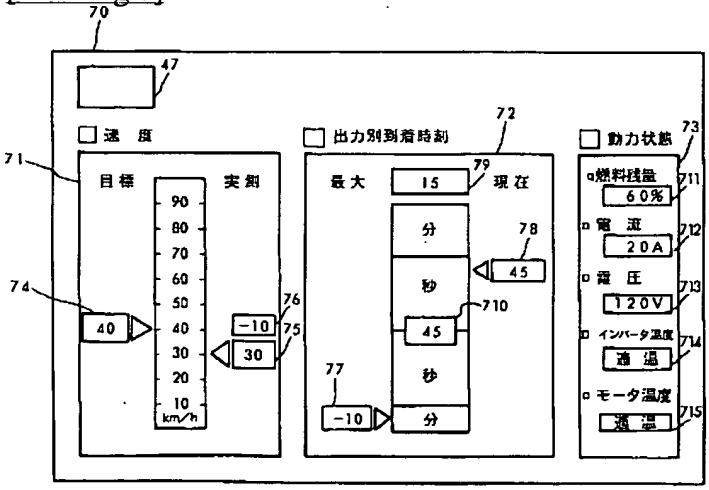
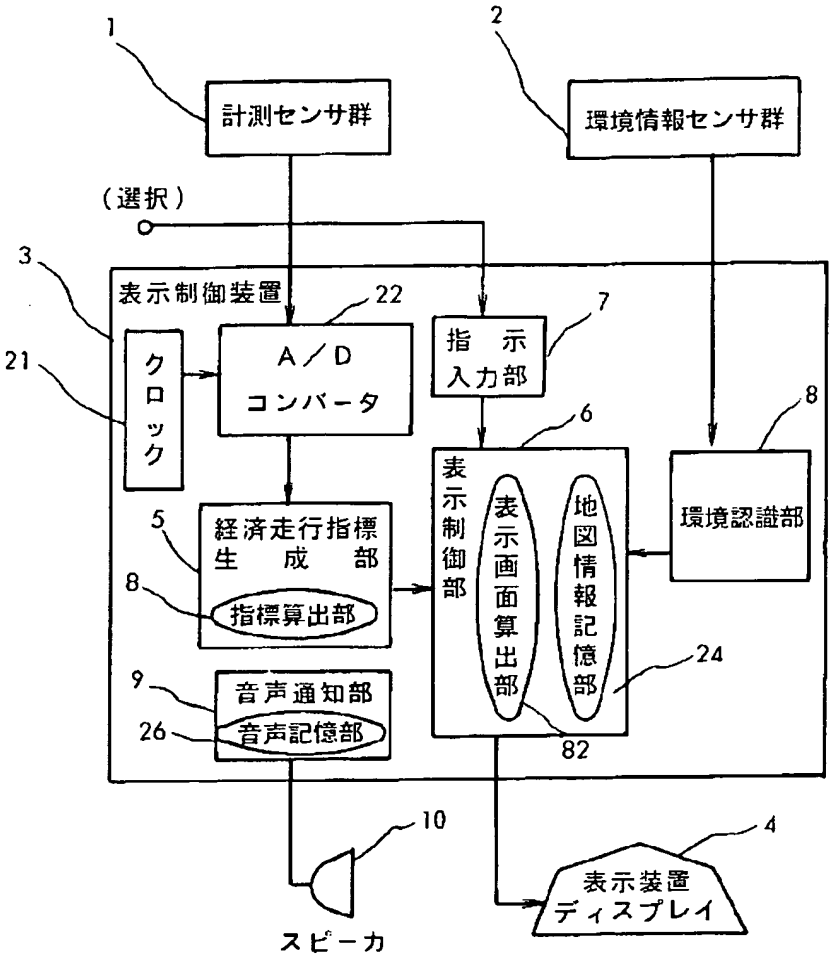


図 7

[Drawing 8]

図 8



[Translation done.]

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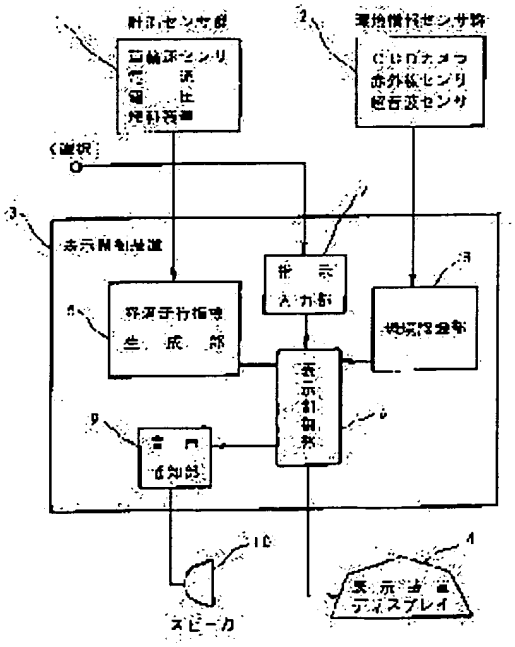
(54) NAVIGATION SYSTEM

(57)Abstract:

PURPOSE: To enable immediate driving operation by displaying plural pieces of detected information and instructions orderly on one display device and enabling an operator to recognize the information and display by viewing one display device.



CONSTITUTION: A display controller 3 consists of an economic travel index generation part 5 which generates an economic travel index on the basis of the measurement result of a measuring sensor group 1, an environment recognition part 8 which recognizes environment on the basis of the measurement result of an environment information sensor group 2, an instruction input part 7 which inputs an instruction by a selecting operator on a display screen, a display control part 6 which determines display contents outputted to a display device 4, a speaker 10 which informs in voice on the basis of the recognition result and the display contents, etc., and a speech informing part 9 which determines the contents informed from the speaker. In this case, images based upon the index generated by the index generating means, the recognition result of the environment recognizing means, and the measurement result of a measured

object are displayed orderly on one screen.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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Ｇ０１Ｃ　21/00	Ｎ			

審査請求　未請求　請求項の数15　ＯＬ　（全　９　頁）

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最終頁に続く

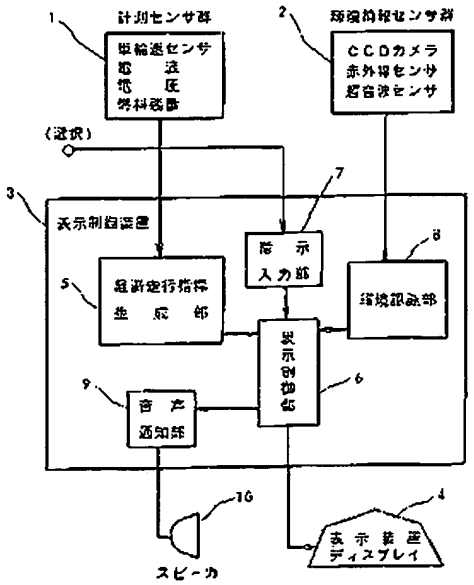
(54)【発明の名称】　ナビゲーションシステム

(57)【要約】

【構成】１は，車速，エンジン油圧，バッテリ電圧，燃料計等の計測センサ群である。２は，充電系統，ブレーキ液面，４ＷＳ，ライト消し忘れ等のウォーニングセンサ群である。３は，路車間情報通信，車々間情報通信などを可能とする通信情報センサ群である。６は，血圧，脳波，脈拍，手の動き等の操作者情報センサ群である。４は，計測センサ群１，ウォーニングセンサ群２，通信情報センサ群３，操作者情報センサ群６からの情報を取り入れ，ディスプレイ５に表示する内容を決定する信号処理部である。

【効果】操作者は表示された情報や指示を表示装置を一つ見ることにより認識し，必要に応じてただちに運転操作することが可能となる。

図　１



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【特許請求の範囲】

【請求項１】複数の測定対象のそれぞれの状態を測定する複数の測定手段と、前記測定手段のそれぞれの測定結果．前記測定結果に対応する指示を表示して、前記測定対象の状態を通知するナビゲーションシステムにおいて．前記測定手段のそれぞれの測定結果に対応する指標生成手段と、前記測定手段のそれぞれの測定結果に基づき走行環境を認識する環境認識手段と．前記指標生成手段により生成された指標と前記環境認識手段による認識結果と前記測定対象の測定結果を一つの画面に表示する表示手段を有することを特徴とするナビゲーションシステム。

【請求項２】複数の測定対象のそれぞれの状態を測定する複数の測定手段と、前記測定手段のそれぞれの測定結果．前記測定結果に対応する指示を表示して、前記測定対象の状態を通知するナビゲーションシステムにおいて．前記測定手段のそれぞれの測定結果に対応する指標生成手段と、前記測定手段のそれぞれの測定結果に基づき走行環境を認識する環境認識手段と．前記指標生成手段により生成された指標と環境認識手段による認識結果と前記測定対象の測定結果を音声により通知する音声通知手段を有することを特徴とするナビゲーションシステム。

【請求項３】請求項１または請求項２において．前記指標生成手段が．予め記憶した指標記憶手段を設け．前記記指標生成手段は、前記指標記憶手段を参照して．前記参照結果に対応する表示画面を出力するナビゲーションシステム。

【請求項４】請求項１または請求項２において．前記測定結果に基づき．前記指標を算出する指標算出手段を設け．前記指標算出手段の算出結果に基づき表示画面を出力するナビゲーションシステム。

【請求項５】請求項１または請求項２において．操作者が表示内容を選択するための指示を入力する指示入力手段を設け、前記指示入力手段の入力結果に基づき．表示画面を出力する機能を有するナビゲーションシステム。

【請求項６】請求項１または請求項２において．操作者が表示内容を選択するための指示を入力する指示入力手段にタッチパネルを用いるナビゲーションシステム。

【請求項７】請求項１または請求項２において．現在位置を示すための地図情報記憶部と操作者の指示を入力する指示入力部を設け、前記環境認識手段の認識結果または操作者の指示に基づき．現在位置を補正する機能を有するナビゲーションシステム。

【請求項８】請求項１または請求項２において．前記測定手段により測定された車両速度と．前記指標生成手段により生成された指標となる車両速度を隣接させて表示し．指標となる車両速度と車両速度との差分を表示するナビゲーションシステム。

【請求項９】請求項１または請求項２において．前記指

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標生成手段により生成された最高速度を維持した場合の目的地到着予定時刻と現在車速を維持した場合の目的地到着予定時刻を隣接して表示するナビゲーションシステム。

【請求項１０】請求項１または請求項２において．現在位置を示すための地図情報記憶部は．道路の形状と道路勾配を記憶するナビゲーションシステム。

【請求項１１】請求項１または請求項２において．前記測定手段により測定された情報、前記指標生成手段により生成された指標等の車両走行時における危険度を判定し．危険度に応じて色を変化させて表示するナビゲーションシステム。

【請求項１２】請求項１または請求項２において．前記指標生成手段が経済走行指標を生成するために前記測定手段により測定する情報に．車両速度、ギヤ位置．スロットル弁開度が含まれるナビゲーションシステム。

【請求項１３】請求項１または請求項２において．前記指標生成手段が目的地まで指定時間内に到達するための指定時間走行指標を生成するために前記測定手段により測定する情報に．車両速度が含まれるナビゲーションシステム。

【請求項１４】請求項１または請求項２において．前記測定結果，前記認識結果等と実際に生じている事象に相違がある場合に．校正あるいは学習するナビゲーションシステム。

【請求項１５】請求項１４において．校正・学習する場合に自動と手動を選択できるナビゲーションシステム。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、車載用ナビゲーションシステムに関する。

【０００２】

【従来の技術】従来、ドライバーがより安全に自動車を運転するために．自動車に装備される計器（車速計，燃料残量計等）の数が増加してきた。しかし、それだけでは安全に自動車を運転するためには不十分である。例えば．見知らぬ土地に行った場合には．従来の計器では自車位置を知ることが出来ない。また目的地までかかる時間や．到着予定時刻を知るためには．ドライバーやナビゲータの経験に頼るしかない。

【０００３】このような問題を解決するために．移動体の現在位置表示装置（特願平3－26916 号明細書）の地図と自動車等の自車位置を表示することが有効である。また．走行状態表示装置（特願平2－264812 号明細書）の車速や燃料消費量からトリップや燃費を算出し表示する．ナビゲーションシステム（特願平2－278115 号明細書）の出発地点から目標地点までの最短距離ルート，最短時間ルート等を検索し．表示する等が有効である。

【０００４】しかし、上記の方法では．道路地図．走行状態．最短ルート等を表示する表示装置が異なるため、

全情報を得るためには複数の表示装置を見なくてはならない。さらに、複数の表示装置に表示された複数の情報を基に、運転者の操作量を決定しなくてはならない。

【０００５】

【発明が解決しようとする課題】上記従来技術では運転者または同乗者が、全ての表示装置を見て、現在どの表示装置が示している情報を最も必要としているかを判断しなければならず、毎回違う場所に設置された表示装置を見るのは、安全上好ましくなかった。さらに経済走行のための目標速度と実際の車両速度を表示する場合に、運転者は目標速度と車両速度を基にアクセル等の操作量を決定するため、二つの情報が異なる表示装置に表示されている場合には、その比較を行うのが難しい。複数の情報を比較しその結果に基づき操作量を決定する場合に、情報が複数の表示装置に表示されていたり、一つの表示装置であっても単に表示しているだけでは、情報の比較に手間がかかり安全上好ましくない。

【０００６】本発明の目的は、操作者が情報や指示を一つの表示装置を見るだけで認識し、必要に応じてただちに運転操作することが可能なナビゲーションシステムを提供することにある。

【０００７】

【課題を解決するための手段】この目的を達成するため、本発明は複数の測定対象のそれぞれの状態を測定する複数の測定手段と、前記測定手段のそれぞれの測定結果、あるいは測定結果に対応する指示を表示して、前記測定対象の状態を通知するナビゲーションシステムにおいて、前記測定手段のそれぞれの測定結果に対応する指標生成手段と、前記測定手段のそれぞれの測定結果に基づき走行環境を認識する環境認識手段と、前記指標生成手段により生成された指標と環境認識手段による認識結果と前記測定対象の測定結果に基づく画像を一つの画面に順序良く表示する表示手段を有することにより、常に、操作者が情報や指示を一つの表示装置を見ることにより認識し、必要に応じてただちに運転操作することが可能になるようにしたものである。

【０００８】

【作用】上述の構成によれば、検出された複数の情報や指示を一つの表示装置に順序良く表示可能なので、操作者は表示された情報や指示を表示装置を一つ見ることにより認識し、必要に応じてただちに運転操作することが可能となる。

【０００９】

【実施例】以下、本発明の実施例を図面に基づいて説明する。

【００１０】図１は、本発明に係るナビゲーションシステムの第１実施例のブロック図である。

【００１１】図１において、１は、車輪速、バッテリー電圧、燃料計等の計測センサ群である。２は、ＣＣＤカメラ、赤外線センサ、超音波センサ等の環境情報センサ群である。３は、本発明に係り、計測センサ群１、環境情報センサ群２の情報を取り入れ、ディスプレイ４に表示する内容を決定する表示制御装置である。本発明に係る動作を行う表示制御装置３は、計測センサ群１の測定結果に基づき、例えば目的地と到着予定時刻が入力された場合の経済走行指標を生成する経済走行指標生成部５と、環境情報センサ群２の測定結果に基づき環境を認識する環境認識部８と、表示画面の選択操作者の指示を入力する指示入力部７と、表示装置４に出力する表示内容を決定する表示制御部６と、認識結果、表示内容等に基づき音声による通知を行うスピーカ１０と、スピーカから通知する内容を決定する音声通知部９により構成されている。

【００１２】計測センサ群１の各センサの出力は検出した物理量の情報を持っている。さらに、この物理量がどの範囲にあるかによって、その部位のシステムが正常か異常か、あるいは危険度がわかる。また環境情報センサ群２の情報は、道路の白線の位置、各種道路標識、前方の障害物等が含まれるものとする。

【００１３】ここでは種々のセンサの測定結果に基づき経済走行指標を生成しているが、センサの測定結果だけでなく目的地とその到着予定時刻を入力し指定時間走行指標、さらに地図情報、通信による位置情報、道路渋滞情報等も加え渋滞回避走行情報を生成してもよい。

【００１４】図２は、本発明を施したナビゲーションシステムに係る構成の第２の実施例を示すブロック図である。第２の実施例のナビゲーションシステムは、特に表示制御装置３が、表示画面や地図などを、予め記憶しておくものであり、それぞれ図１で示した計測センサ群１、環境情報センサ群２、および指示入力部７、表示装置４、スピーカ１０に接続されて構成されている。経済走行指標生成部５が、指標を記憶している指標記憶部２３を、表示制御部６が、表示方法を記憶している表示画面記憶部２５と地図情報記憶部２４を、音声通知部９が通知する音声を記憶している音声記憶部２６を備えている。

【００１５】ここで指標記憶部２３は、目的地と到着予定時刻が入力された場合には目標速度を、目的地のみが入力された場合には到着予定時刻を出力する。地図情報記憶部２４は、道路地図、道路勾配等を記憶している。表示画面記憶部２５は、計測センサ群１で測定された測定結果と経済走行指標生成部５により生成された指標と環境認識部８により認識された認識結果等を表示する表示画面を記憶し、指示入力部７に入力された表示内容選択信号により表示する画面を検索し、決定する。

【００１６】Ａ／Ｄコンバータ２２は、クロック２１からのサンプリング信号が入力されると計測センサ群１の値を、Ａ／Ｄ変換し経済走行指標生成部５に入力する。

このように第２の実施例のナビゲーションシステムでは、表示画面等を予め記憶しておく。このことにより、

表示画面の選定を高速に行うことができる。また、計測センサ群1，経済走行指標生成部5、環境認識部8からの信号を一度に出力することが出来る。また、必要に応じて表示内容を選択して出力することも可能である。

【0017】図3は、図2における指標記憶部の記憶データ構造とその内容の一実施例を示す説明図である。本実施例では、説明を容易にするために、図2の経済走行指標生成部で参考にする内容を、車速、スロットル開度、燃料残量の3種類としており、図2の指標記憶部の記憶データ構造は3次元配列となる。そして、この指標記憶部は、図2におけるA／Dコンバータ22の最小ビット毎に走行指標内容を記憶している。また、車速，スロットル開度，燃料残量のフルスパンをそれぞれV（km／h），T（deg），L（l）としている。

【0018】図中、Aは平常状態であり、車速がV（i）（km／h）で、スロットル開度がT（j）（deg）、そして燃料残量がL（k，l）である。また、Bは、車速がV（v）で、スロットル開度がT（j）、そして燃料残量がL（k）の高速状態、Cは、車速がV（i）で、スロットル開度がT（t）、そして燃料残量がL（k）のスロットル全開状態、Dは、車速がV（i）で、スロットル開度がT（j）、そして燃料残量がL（k）のガス欠状態を示す。このような記憶データ構造により、図2の経済走行指標生成部5は、A～Dのような状態で、どの情報（車速，スロットル開度，燃料残量）が経済走行に重要なものであり、今後の車速の変化のさせ方等経済的に走行するための指標を生成することが出来る。

【0019】図4は、図2における表示装置の表示画面の画面構成の一実施例を示す説明図である。本実施例は、燃料残量メータ41、車速メータ42，エンジン回転メータ43、経済走行指標表示スペース44、車載カメラによるビデオ画像45、道路地図46、さらに画面選択ボタン47、48，410，ビデオ画像の認識結果表示部49により構成されている。ここで、経済走行指標表示部44は目的地と目的地までの距離が入力された場合に、現在の車速等から目的地到着予定時刻を割り出し、表示した例である。また、認識結果表示スペース49は高速道路の標識を認識した結果を表示した例である。

【0020】尚、運転者あるいはナビゲータは、画面選択ボタン47、48，410を用いて、欲しい情報のみを表示させておくこともできる。画面選択は、タッチパネルあるいはキーボードで行う。ビデオ画像45に関しては、画像を見やすくするため、ビデオ画像の左半分のいずれかの部分に触れることにより画面選択が出来る。校正・学習ボタン411は、車両情報や画像認識結果等に基づき、ボタンスペースに各種メッセージを出力する。ここでは、メッセージとして現在位置（横浜IC）を出力しているが、速度超過，燃料不足といった自車情報、前方の車との距離といった周囲の自動車等の状況，天候や路面状況といった走行環境等を出力しても良い。

【0021】また現在位置等では、算出結果と認識結果が異なることがある。この場合にはメッセージ出力中に、ボタンを押すことにより位置の校正を行うことができる。また現在位置を算出する計算式の学習も行える。さらにボタンを押した場合に校正・学習を行う（マニュアル）、ボタンを押さない場合に校正・学習を行う（自動）の選択をすることができる。

【0022】図5は、図4における表示画面の画面選択ボタン47を選択した画面構成の実施例を示す説明図である。本実施例における表示画面50は、燃料残量メータ41と車速メータ42とエンジン回転メータ43より構成される。画面選択を自由に出来るようにしたことにより、ドライバーまたはナビゲータが走行に不要と感じた表示内容を削除することが出来る。また、必要に応じて再度画面選択ボタン47を選択することにより、図4の表示画面に戻ることが出来る。

【0023】図6は、図4における表示画面の画面選択ボタン48を選択した画面構成の実施例を示す説明図である。本実施例における表示画面60では、走行指標表示スペース44と、インターチェンジにおける現在位置補正用ボタン62と、交差点における現在位置補正用ボタン63と、その他の地点における現在位置補正用ボタン64と、現在位置補正用確認ボタン61により構成される。ここで、走行指標表示スペースは、目的地と到着予定時刻が入力された場合の目標車速を表示したものである。インターチェンジにおける現在位置補正用ボタンと、交差点における現在位置補正用ボタンと、その他の地点における現在位置補正用ボタンは、それぞれ高速道路等のインターチェンジや交差点等にさしかかった時に選択することにより現在位置の補正を行う。さらに補正の確認を現在位置補正用確認ボタンで行う。必要に応じて、再度、画面選択ボタン48を選択することにより、図4の表示画面に戻ることが出来る。

【0024】このように経済走行指標生成部5は、計測センサ群1の各値の組み合わせに対応した表示画面を全て記憶しており、クロック21の時間刻みごとの、計測センサ群1の各値の入力に遅れることなく経済走行指標を検索し、ディスプレイに出力できる。尚、実施例では、簡単のために表示する内容が車速、エンジン回転数、燃料残量の3種類であると仮定したが、計測センサ群1の計測項目がM種類の場合は、経済走行指標生成部5の記憶データ構造はM次元配列となる。

【0025】図7は、計測センサ群1により測定した情報と経済走行指標生成部5により生成した走行指標を表示した画面構成の実施例を示す説明図である。本実施例における表示画面70では、表示画面変更ボタン47と、速度表示スペース71、出力別到着予定時刻表示スペース72，動力状態表示スペース73により構成され

る。

【００２６】速度表示スペース７１は、目標車両速度表示スペース７４に目標車両速度，車両速度表示スペース７５に車両速度，目標車両速度と車両速度の差分表示スペース７６に目標車両速度と車両速度の差分を表示する。

【００２７】出力別到着予定時刻表示スペース７２は、最大出力を維持した場合の目的地到着予定時刻表示スペース７７に最大出力を維持した場合の目的地到着予定時刻，現在出力を維持した場合の目的地到着予定時刻表示スペース７８に現在出力を維持した場合の目的地到着予定時刻，経過時間表示スペース７９に出発時刻からの経過時間，残り時間表示スペース７１０に目的地への目標到着時間までの残り時間を表示する。

【００２８】動力状態表示スペース７３は、燃料残量表示スペース７１１に燃料残量，電流表示スペース７１２に電流，電圧表示スペース７１３に電圧，インバータ温度表示スペース７１４にインバータ温度，モータ温度表示スペース７１５にモータ温度を表示する。また出力別到着予定時刻が，目標到着時刻と大幅にずれる場合には数値のみでなく色を変えて表示してもよい。動力状態が走行する上で支障をきたす，または支障をきたしそうな場合も数値表示のみではなく色を変えて表示してよい。さらに、動力状態を数値で表示しているがその限りではない。

【００２９】図８は、本発明のナビゲーションシステムの第３の実施例を示すブロック図である。本実施例のナビゲーションシステムは，特に表示制御装置３が，表示画面や経済走行指標を、算出して求めるものであり、それぞれ図１で示した計測センサ群１，環境情報センサ群２，および指示入力部７，表示装置４，スピーカ１０に接続されている。経済走行指標生成部５が，指標を算出する指標算出部８１を、表示制御部６が，表示方法を算出する表示画面算出部８２と地図情報記憶部２４を、音声通知部９が通知する音声を記憶している音声記憶部２６を備えている場合を示す。

【００３０】ここで指標算出部８１は，目的地と到着予定時刻が入力された場合には目標速度を、目的地のみが入力された場合には到着予定時刻を出力する。地図情報記憶部２４は，道路地図，道路勾配等を記憶している。表示画面算出部８２は，計測センサ群１で測定された測定結果と経済走行指標生成部５により生成された指標と環境認識部８により認識された認識結果等を表示する表示画面を算出し，指示入力部７に入力された表示内容選択信号により表示する画面を決定する。Ａ／Ｄコンバータ２２は，クロック２１からのサンプリング信号が入力されると計測センサ群１の値を、Ａ／Ｄ変換し経済走行指標生成部５に入力する。このように第３の実施例のナビゲーションシステムでは，表示画面等を算出する。このことにより，表示画面の記憶容量を少なくすることができる。

【００３１】図８は、経済走行指標生成部５が各種走行指標を演算により決定する指標算出部８１を、表示制御部６が各種表示方法を演算により決定する表示画面算出部８２を備えている場合の本実施例のブロック図である。Ａ／Ｄコンバータ２２は，クロック２１からのサンプリング信号が入力されると計測センサ群１の値を、Ａ／Ｄ変換し指標算出部８１に入力する。指標算出部８１はこの値とにより表示する指標の各種情報を演算し決定する。また、ドライバーまたはナビゲータにより指示入力部７に入力された表示画面の選択情報により表示する画面の各種情報を演算し決定する。

【００３２】以上の二つの実施例において、経済走行指標生成部５と表示制御部６がそれぞれ指標記憶部２３と表示画面記憶部２４を備えている場合と、指標算出部８１と表示画面算出部８２を備えている場合の違いは、以下に述べる通りである。すなわち、表示制御部６が表示内画面記憶部２４を備えている場合には，表示画面が全て予め記憶されているので，表示制御部６は演算を何一つ行う必要が無い反面、各種表示画面を記憶しておくための多くの記憶容量が必要となる。これに対して表示制御部６が表示画面算出部８２を備えている場合は，表示制御部６は、各種演算式を記憶しておくのみであるので、記憶容量が少なくてすむ反面、これらの演算式を用いて各種表示画面を算出する必要があるため、表示制御部６は若干の計算を行う必要がでてくる。従って、表示制御部６が表示内画面記憶部２４を備えている方法と，表示画面算出部８２を備えている方法のいずれを用いるかは、表示制御部６の演算能力と記憶容量の関係から決定すれば良い。これは，経済走行指標生成部５に関しても同様である。

【００３３】

【発明の効果】本発明によれば、検出された複数の情報や指示が一つの表示装置に表示されるため、操作者は、表示された情報や指示を１画面見るだけで瞬時に認識することが可能となる。

【図面の簡単な説明】

【図１】本発明の第１実施例のブロック図。

【図２】経済走行指標生成部，表示制御部がそれぞれ指標記憶部，表示画面記憶部を備えている場合のブロック図。

【図３】指標記憶部の記憶データ構造の説明図。

【図４】車両情報，経済走行指標，ビデオ画像，道路地図を表示した場合の画面説明図。

【図５】車両情報を表示した場合の正面図。

【図６】経済走行指標を表示した場合の正面図。

【図７】車両情報と経済走行指標を表示した場合の画面の説明図。

【図８】経済走行指標生成部，表示制御部がそれぞれ指標算出部，表示画面算出部を備えている場合のブロック

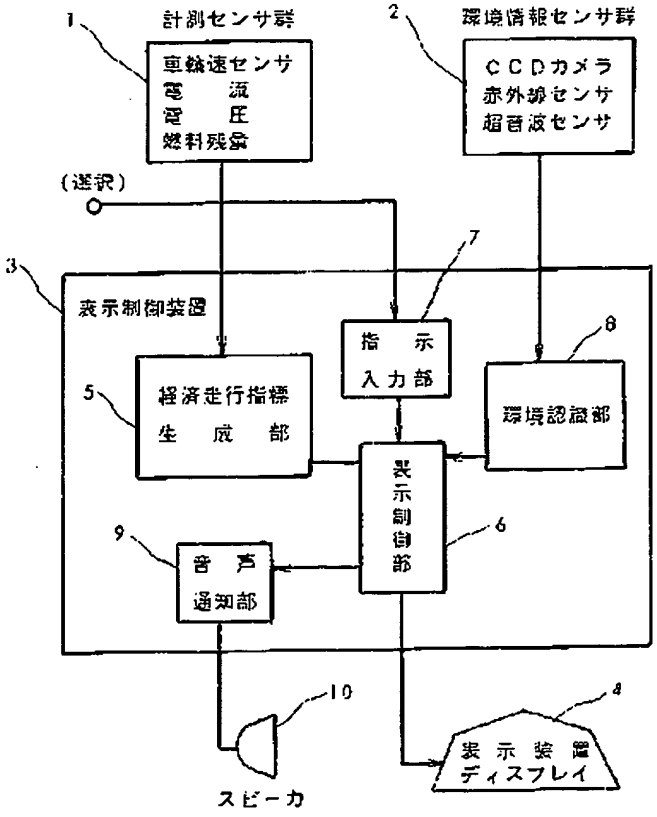
図。

【符号の説明】

1…計測センサ群、2…環境情報センサ群、3…表示制＊御装置、4…表示装置、5…経済走行指標生成部、6…表示制御部、7…指示入力部、8…環境認識部、8…音声通知部、10…スピーカ。

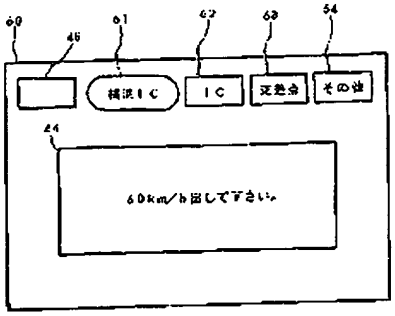
【図1】

図　1



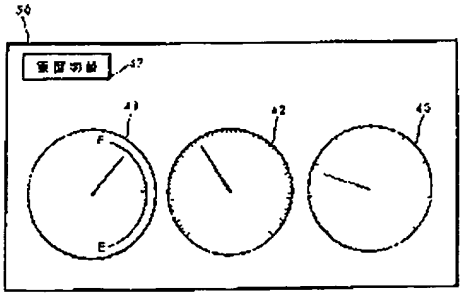
【図6】

図　6



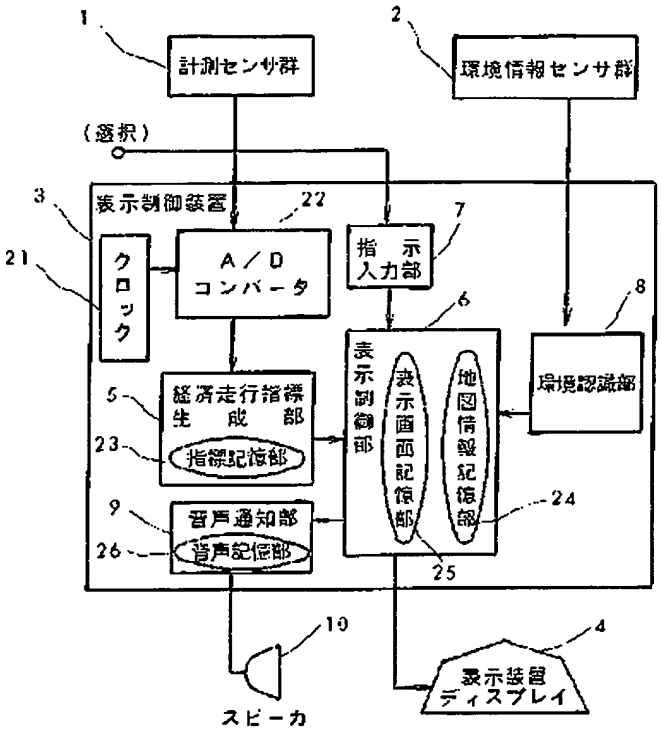
【図5】

図　5



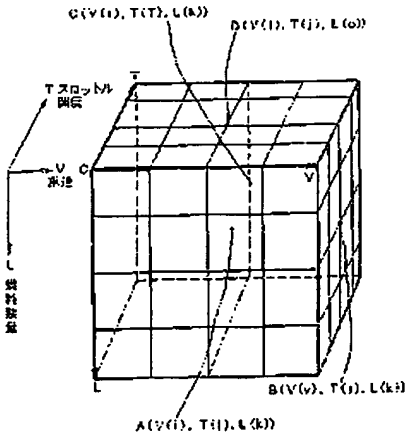
【図2】

図 2



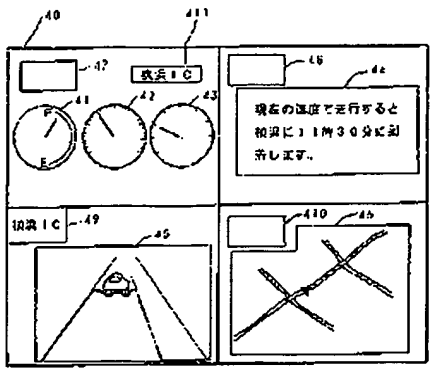
【図3】

図 3

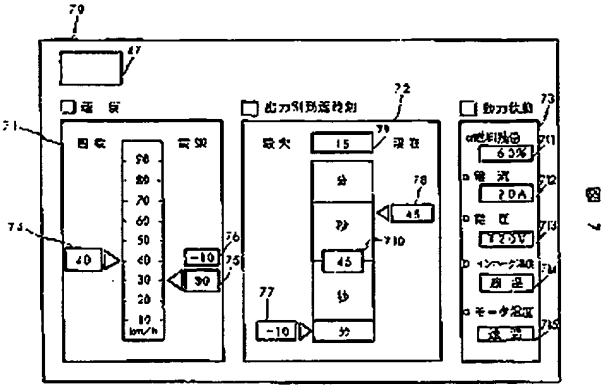


【図4】

図 4

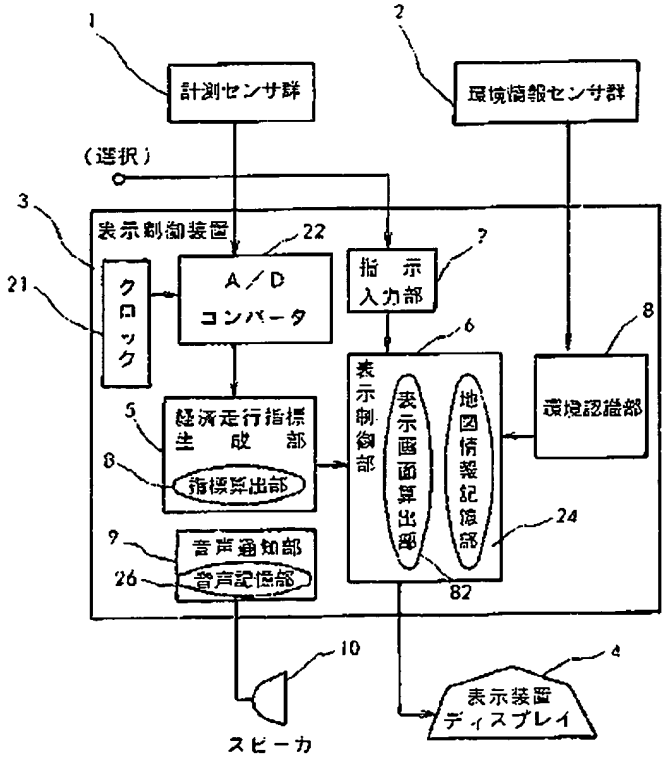


【図7】



【図8】

図 8


1
計測センサ群
2
環境情報センサ群
(選択)
3
表示制御装置
22
A／D
コンバータ
21
クロック
7
指示
入力部
6
8
表示制御部
表示画面算出部
地図情報記憶部
環境認識部
5
経済走行指標
生成部
8
指標算出部
24
9
音声通知部
26
音声記憶部
82
10
スピーカ
4
表示装置
ディスプレイ

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